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SYNTHETIC STRING FOR RACKETS AND METHOD FOR MANUFACTURING THE SAME

The object of the present invention is a composite synthetic string, designed in particular, but not exclusively for stringing tennis rackets or rackets for other types of similar ball games, such as squash or badminton and a method and device that gives flexibility to the string for allowing the rackets to be strung more easily.

Composite synthetic strings are already known. FR-A-2 491 098 discloses a synthetic string with two components: multifilament polyamide threads and polyurethane, the multifilaments being integrated in a polyurethane matrix. The polyurethane binder, whose elastic behavior is much greater than that of polyamide, allows greater resistance to breaking and medium hardness resulting in a rapid return of the string to its initial position after impact of a ball to be obtained with a particular structure of the string.

Monofilament tennis strings extruded from polyester and/or polyetherether presenting a lifetime that is greater than that of the strings cited above are also known, but with inferior game characteristics. These strings, due to their rigidity, are very difficult to string, so this operation requires more time than with one of the strings cited previously.

The object of the present invention is a tennis or similar racket string, composite or monofilament, that allows easy stringing with an equivalent lifetime, and presents better gripping of the ball on the racket face during impact as well as a novel characteristic aspect.

According to the present invention, the synthetic string, particularly for tennis rackets, is characterized in that it presents a series of dimples distributed according to a given step.

The manufacturing process is characterized in that, after its production, the string sequentially undergoes pressures according to a given step.

This pressure may be exerted on a single side of the string or on several sides of the latter in the long axis of the latter or in a helix.

According to another characteristic of the invention, the dimples are diametrically opposed with relation to each other.

This operation locally produces a sort of hardening that gives the desired flexibility and a novel appearance to the string. In the case of a monofilament polyester or similar string, this operation gives the flexibility that is necessary for easy stringing of the string. In fact, the pressure leads to a local disorganization of the molecular network that results in a modification in the reflection coefficient. In the case of a polyamide-polyurethane string such as that mentioned previously, as in the case of a polyester string, better grip of the ball on the racket face is observed, hence the stronger effects.

The invention also deals with a device allowing the implementation of the method. In a preferred embodiment, the string is conveyed between two pairs of wheels in which one is toothed in such a way that the string is hammered successively on one side and then on the opposite side.

Other characteristics and advantages of the invention will appear in the course of the following description of a

particular embodiment, given only by way of a non-limiting example, with regard to the drawings which show:

- Figure 1, a view of a section of string according to the invention.

- Figure 2, a view of a device for implementing the method comprising two pairs of wheels.

In Figure 1, one can see that the section of string 2 presents dimples 1 on its two sides resulting from the pressure exerted by the teeth of the toothed wheels. The height of said dimples is on the order of five hundredths of mm for a string whose diameter is 1.4 millimeters. The step of the dimples is, for example, four millimeters.

These dimples 1 preferably are formed between two wheels wherein one presents a guiding recess and wherein the other is equipped with teeth. Such a device is schematically represented in Figure 2.

String 2 is held between two guide rollers 3 and 4. The guide rollers 3 and 4 are disposed on both sides of two pairs of wheels respectively 5, 6 and 7, 8, each wheel of a pair turning in the opposite direction from the other wheel. Therefore, if the toothed wheel 5 turns in the counterclockwise direction, the guiding wheel 6 turns in the clockwise direction. The same is true for the second pair. The dimples are formed by peripheral contact of the teeth 9 with the upper part of the string 2. The transport speed of the string may vary, for example from 60 to 200 meters per minute. In fact, this speed is only limited to the impression speed when the hammering operation is performed in combination with an impression head.

The wheels are simply driven by the passage of the thread 2. However, they may be equipped with an autonomous

motorized drive. In addition, a cylinder (not represented) exerts the necessary pressure between the pairs of wheels.

EXAMPLE:

The string represented in Figure 1 is a 625 TGV TECNIFIBRE® type string, with a diameter of 1.40mm and presents a resistance to breaking that is greater than 80 daNs. Its breaking elongation is on the order of 25% and its mass is 1.87 grams per meter, with eleven polyamide 6.6 multifilament threads, each including 140 filaments whose diameter is 28 microns coated with polyurethane. The set of threads is twisted at a rate of 80 turns per meter. The dimples are spaced by four millimeters and their depth is five hundredths of a millimeter.

The operation just described allows a greater ease of stringing in the case of very taut polyester or similar strings and gives a better grip of the ball on the racket face and, consequently, an increase in effects.

It goes without saying that numerous embodiments may be produced, especially by substituting technically equivalent means without necessarily departing from the scope of the invention. In particular, the present invention may be applied to any thermoplastic synthetic string.